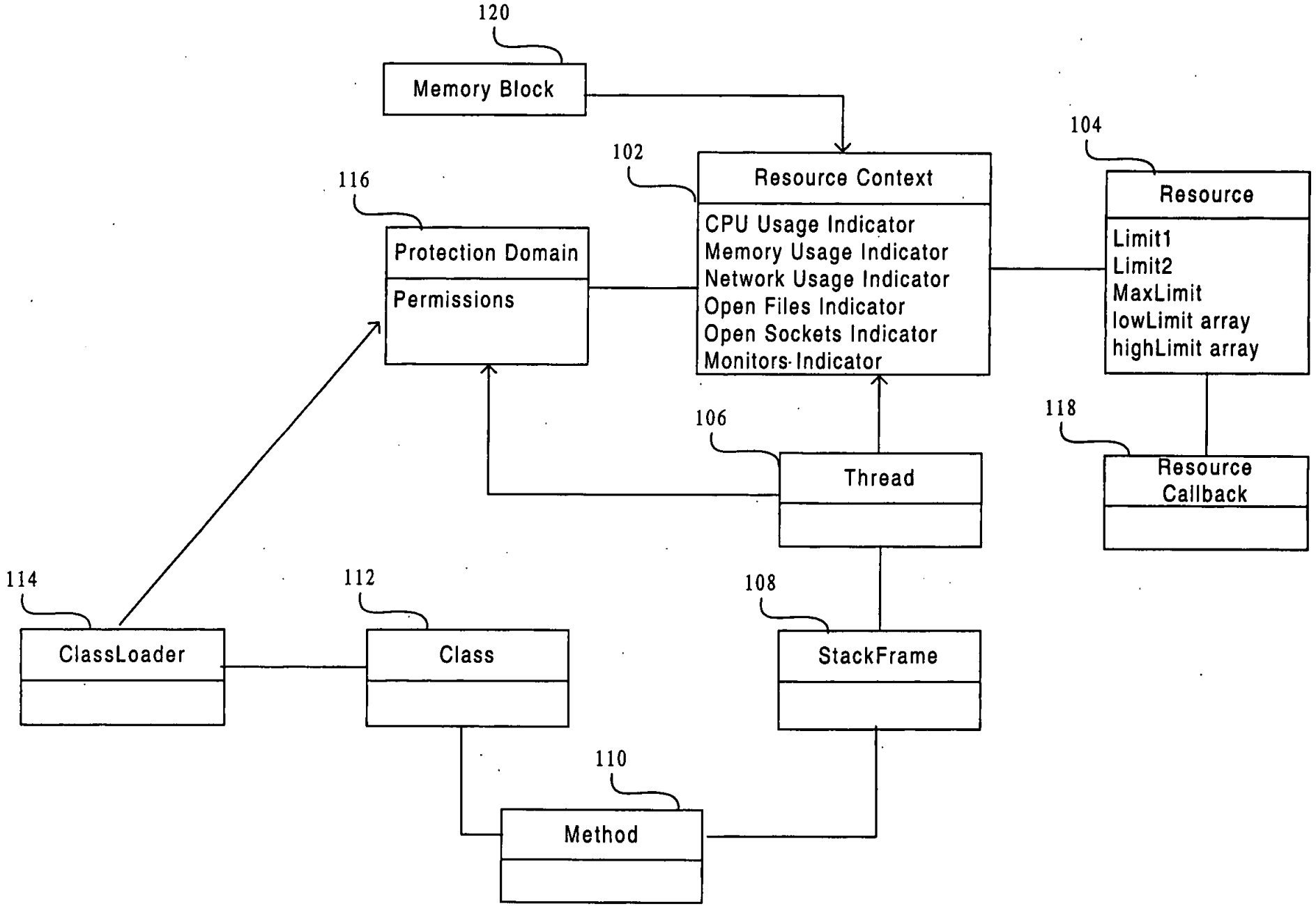
120
Memory Block
102
Resource Context
CPU Usage Indicator
Memory Usage Indicator
Network Usage Indicator
Open Files Indicator
Open Sockets Indicator
Monitors Indicator
104
Resource
Limit1
Limit2
MaxLimit
lowLimit array
highLimit array
116
Protection Domain
Permissions
106
Thread
118
Resource Callback
114
ClassLoader
112
Class
108
StackFrame
110
Method

Figure 1

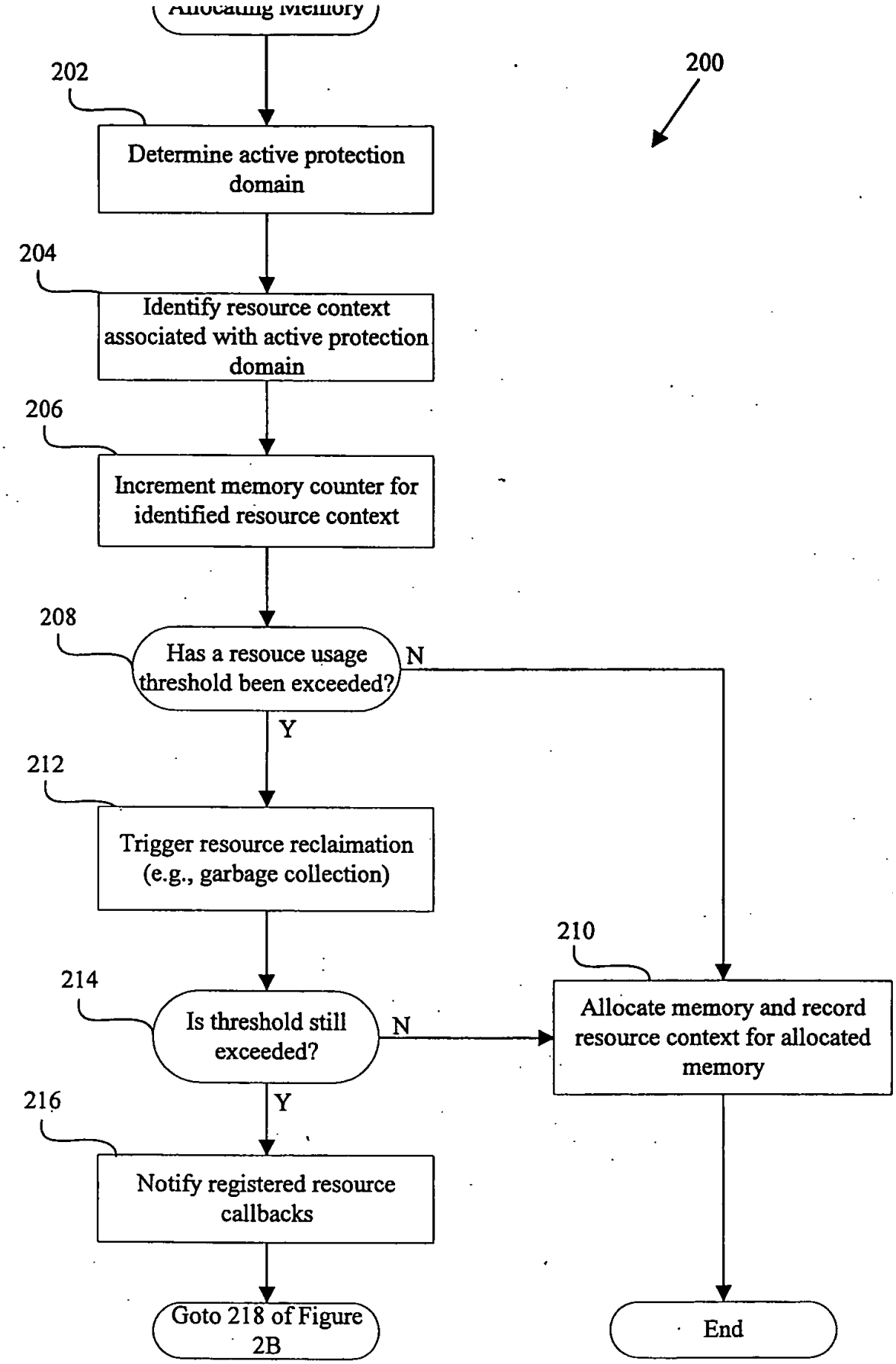
Allocating Memory
200
202
Determine active protection domain
204
Identify resource context associated with active protection domain
206
Increment memory counter for identified resource context
208
Has a resouce usage threshold been exceeded?
N
Y
212
Trigger resource reclaimation (e.g., garbage collection)
210
214
Is threshold still exceeded?
N
Allocate memory and record resource context for allocated memory
Y
216
Notify registered resource callbacks
Goto 218 of Figure 2B
End

Figure 2A

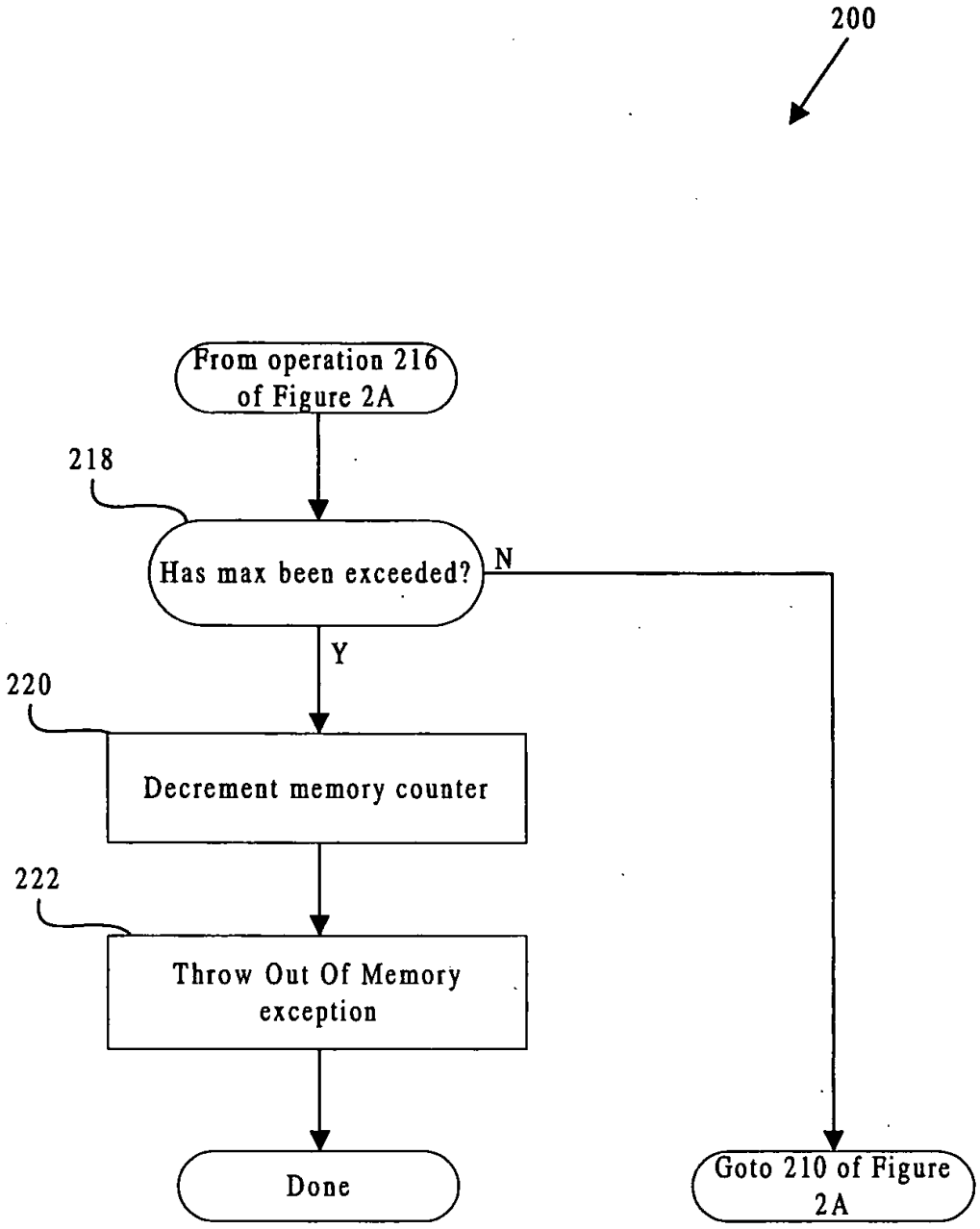
200
From operation 216 of Figure 2A
218
Has max been exceeded?
N
Y
220
Decrement memory counter
222
Throw Out Of Memory exception
Done
Goto 210 of Figure 2A

Figure 2B

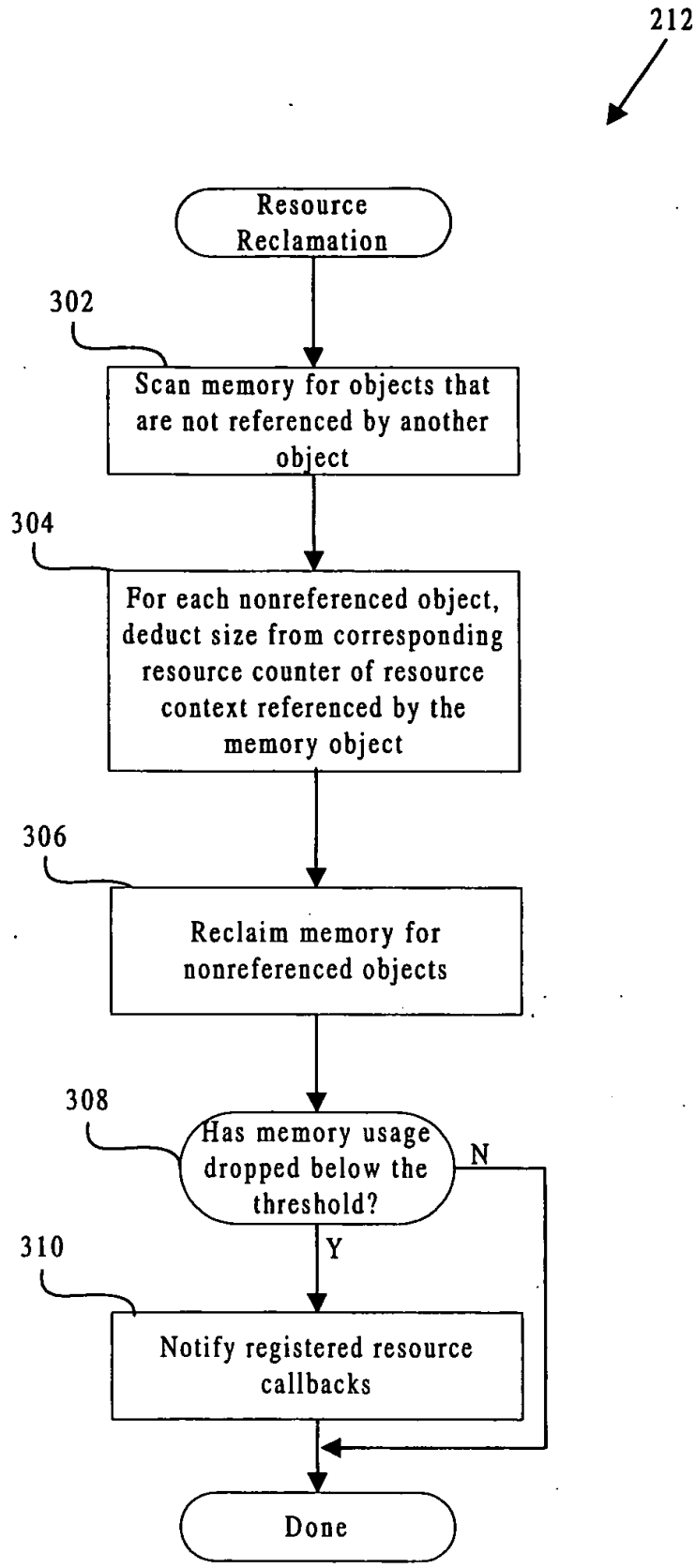
212
Resource Reclamation
302
Scan memory for objects that are not referenced by another object
304
For each nonreferenced object, deduct size from corresponding resource counter of resource context referenced by the memory object
306
Reclaim memory for nonreferenced objects
308
Has memory usage dropped below the threshold?
N
Y
310
Notify registered resource callbacks
Done

Figure 3

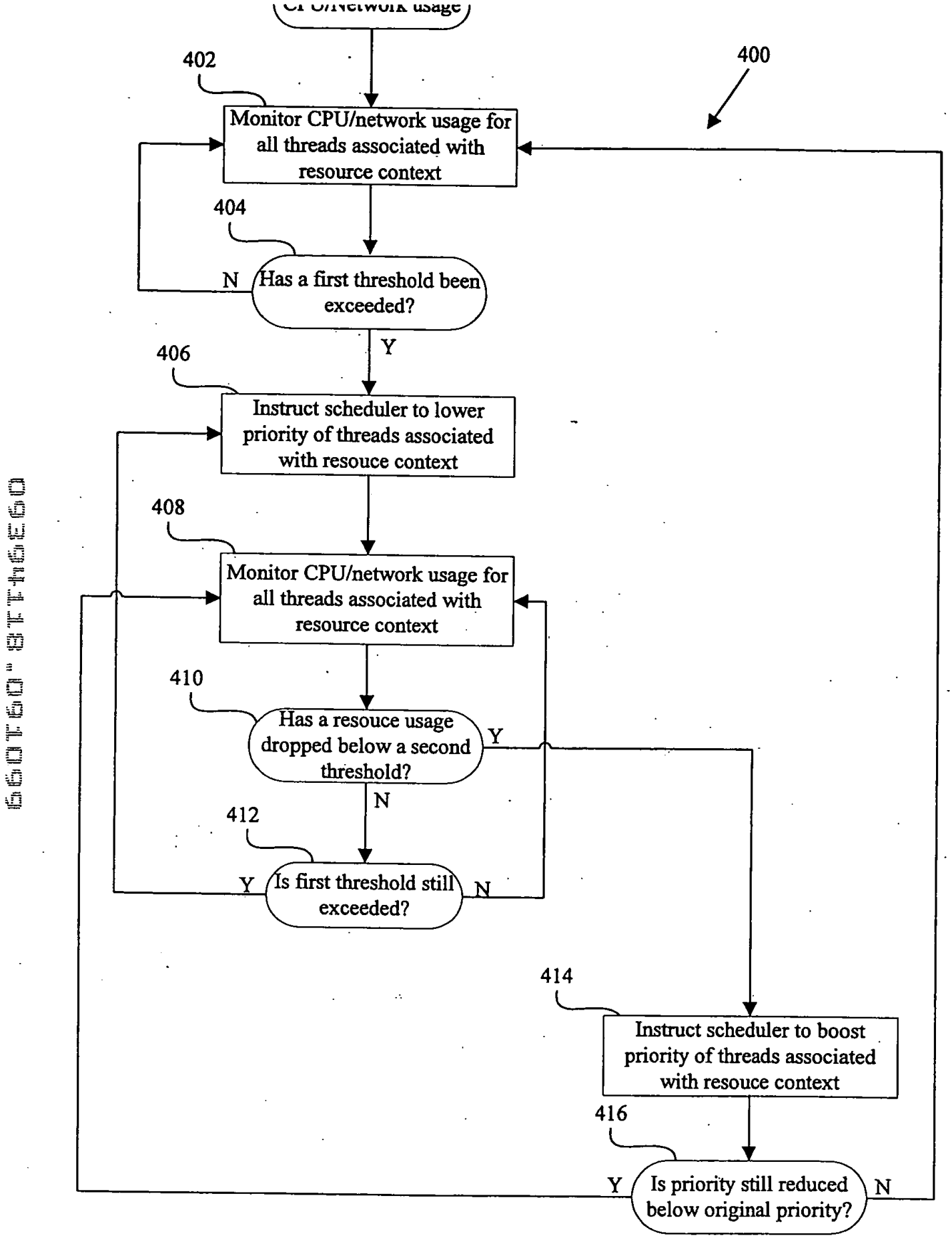
CPU/Network usage
402
400
Monitor CPU/network usage for all threads associated with resource context
404
N
Has a first threshold been exceeded?
Y
406
Instruct scheduler to lower priority of threads associated with resouce context
408
Monitor CPU/network usage for all threads associated with resource context
410
Has a resouce usage dropped below a second threshold?
Y
N
412
Y
Is first threshold still exceeded?
N
414
Instruct scheduler to boost priority of threads associated with resouce context
416
Y
Is priority still reduced below original priority?
N

Figure 4

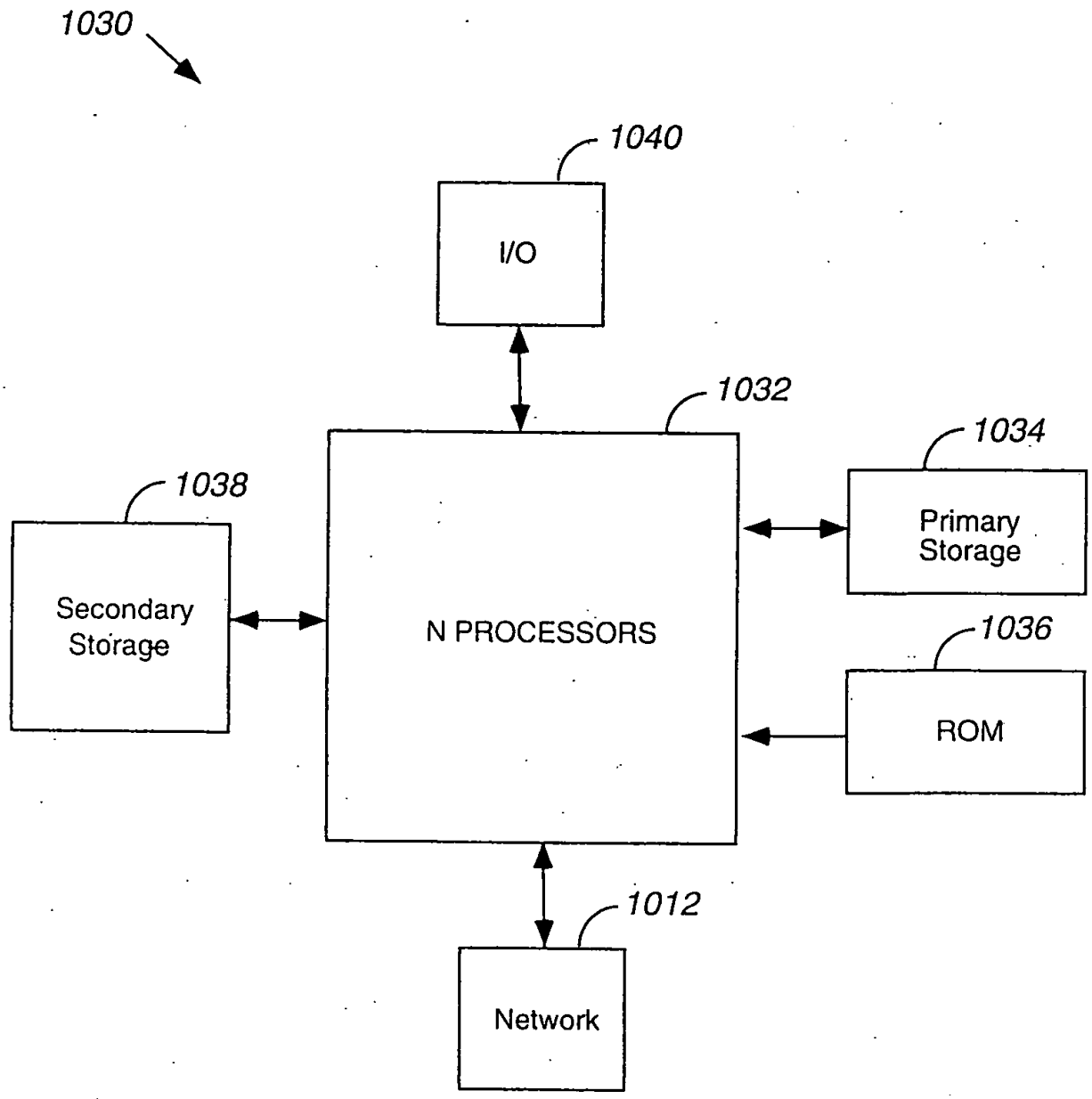
1030
1040
I/O
1032
1034
1038
Secondary Storage
N PROCESSORS
Primary Storage
1036
ROM
1012
Network

Figure 5